IN THE CLAIMS

1- 22. (Previously cancelled).

23. (currently amended) A transducer element of a magnetic material for a torque or force sensor which comprises: at least one annulus of magnetised material extending about an axis,

the at least one annulus being magnetised ~~such that~~ to establish a closed loop of magnetic flux ~~is established~~ in the magnetic material,

the at least one annulus being responsive to a torque applied about said axis for a torque sensor or to a bending moment acting about said axis due to an applied force for a force sensor ~~, as the case may be,~~ to emanate a magnetic field component externally of said element that is a function respectively of the applied torque or the applied force, ~~as the case may be,~~

the magnetisation established in the at least one annulus ~~provides a torque-dependent~~ emanating said magnetic field component ~~which has~~ to have a significant non-zero value at zero torque or force and an essentially zero value at a non-zero torque or force. ~~, as the case may be~~.

24. (original) A transducer element as claimed in Claim 23 in which the at least one annulus is in the form of an annular ring attachable to a shaft, and the annular ring is of a magnetoelastic material and is circumferentially magnetised.

25. (original) A transducer element as claimed in Claim 23 in which the at least one annulus is of magnetoclastic material and is a circumferentially magnetised, integral portion of a shaft.

26. (original) A transducer element as claimed in Claim 23 in which the at least one annulus is longitudinally magnetised in the direction of said axis.

27. (original) A transducer element as claimed in Claim 26 in which the at least one annulus is an integral portion of a shaft.

28. (currently amended) A transducer element as claimed in Claim ~~24~~ 25 comprising a first annulus of magnetised material and a second annulus of magnetised material, wherein said first annulus ~~provides~~ emanates an essentially zero value of magnetic field component at a non-zero value of torque or force of a given polarity and said second annulus ~~provides~~ emanates an essentially-zero value of magnetic field component at a non-zero value of torque or force of the opposite polarity.

29. (currently amended) A transducer element as claimed in Claim 27 comprising a first annulus of magnetised material and a second annulus of magnetised material, wherein said first annulus ~~provides~~ emanates an essentially zero value of magnetic field component at a non-zero value of torque or force of a given polarity and said second annulus provides an essentially-zero value of magnetic field component at a non-zero value of torque or force of the opposite polarity.

30. (currently amended) A transducer element ~~as claimed in Claim 23 in which said~~ of a magnetic material for a force or a torque sensor wherein the element has an axis about which a torque is applicable or about which a bending moment is impressible due to an applied force, the transducer element ~~has~~ comprising: a surface extending radially of said axis, ~~and comprising~~ a first annulus of magnetisation extending to said surface and a second annulus of magnetisation extending to said surface radially outwardly of said first annulus, said first annulus and said second annulus being magnetised to ~~provide~~ emanate a magnetic field component therebetween externally of said surface which has a significant non-zero value at zero value of applied torque or force ~~, as the case may be~~; and an essentially zero value at a non-zero value of applied torque or force. ~~, as the case may be.~~

31. (original) A transducer element as claimed in Claim 30 in which said first annulus is magnetised in the direction of said axis with a pole of given polarity at said surface and in which said second annulus is magnetised in the direction of said axis with a pole of opposite polarity at said surface.

32. (original) A transducer element as claimed in Claim 30 in which said first annulus and said second annulus are each magnetised to form a respective closed loop of circumferential magnetisation, and the respective closed loops of circumferential magnetisation are of opposite polarity.

33. (currently amended) A transducer element as claimed in Claim 27 ~~comprising a respective further annulus~~ in which the at least one annulus comprises a first annulus of magnetisation located adjacent an exterior surface of the transducer element and a second annulus of magnetisation located radially inwardly of the ~~at least one~~ first annulus of magnetisation, ~~and~~ said first annulus and said second annulus being longitudinally magnetised in the axial direction with ~~a polarity~~ opposite of magnetisation ~~thereto~~ to form a closed loop of magnetic flux. ~~therewith.~~

34. (original) A transducer assembly comprising a transducer element as claimed in Claim 23 and a magnetic sensor arrangement oriented to detect said magnetic field component.

35. (original) A transducer assembly comprising a transducer element as claimed in Claim 24 and a respective magnetic sensor arrangement for the at least one magnetised annulus and oriented to detect a magnetic field component in the direction of said axis.

36. (original) A transducer assembly comprising a transducer element as claimed in Claim 26 and a respective magnetic sensor arrangement for the at least one magnetised annulus and

oriented to detect a magnetic field component in the circumferential (tangential) direction about said axis.

37. (currently amended) A transducer assembly comprising a transducer element as claimed in Claim 28 and first and second magnetic sensor arrangements oriented for detecting a respective magnetic field component in the direction of said axis emanated by said first annulus and by said second annulus. ~~, each of said first and second magnetic sensor arrangements being oriented to detect a magnetic field component in the direction of said axis.~~

38. (currently amended) A transducer assembly comprising a transducer element as claimed in Claim 29 and first and second magnetic sensor arrangements oriented for detecting a respective magnetic field component in the circumferential (tangential) direction about said axis emanated by said first annulus and by said second annulus. ~~, each of said first and second magnetic sensor arrangements being oriented to detect a magnetic field component in the circumferential (tangential) direction about said axis.~~

39. (currently amended) A transducer assembly comprising a transducer element as claimed in Claim 30 and a magnetic sensor arrangement oriented to detect said magnetic field component ~~provided~~ emanated between said first annulus and said second annulus.

40. (original) A transducer assembly comprising a transducer element as claimed in Claim 31 and a magnetic sensor arrangement located to be responsive to the magnetic field between said first annulus and second annulus and oriented to detect a magnetic field component in the circumferential (tangential) direction about said axis.

41. (original) A transducer assembly comprising a transducer element as claimed in Claim 32 and a magnetic sensor arrangement oriented to detect a radially directed magnetic field component between said first annulus and said second annulus.

42. (original) A torque sensor system comprising a transducer assembly as claimed in Claim 37 responsive to torque applied about said axis, wherein said first and second magnetic field sensor arrangements provide first and second torque-dependent signals respectively, and further including signal processing means which comprises a first channel responsive to at least one of the first and second torque-dependent signals, said first channel comprising an output means having a controllable gain for producing an output signal representing a measure of torque, and which also comprises a second channel comprising means for combining the first and second torque-dependent signals to provide a reference signal, said output means being responsive to said reference signal to adjust its gain in a sense acting to eliminate changes in the response relating the first and second torque-dependent signals with torque.

43. (original) A torque sensor system as claimed in Claim 42 in which the combining means is operable to effect a difference operation on said first and second torque-dependent signals.

44. (original) A torque sensor system as claimed in Claim 43 in which the first channel is responsive to both of said first and second torque-dependent signals to effect a summing operation thereon.

45 - 50. (cancelled without prejudice to reinstate the same at a later time, i.e., without disclaimer) ~~A method of forming a transducer element which is as claimed in Claim 23 in which the magnetisation of said at least one annulus is performed while the transducer element is under a predetermined torque of one polarity about said axis.~~

~~46. A method of forming a transducer element which is as claimed in Claim 28 in which the magnetisation of the first annulus is performed while the transducer element is under a predetermined torque of one polarity about said axis, and the magnetisation of the second annulus is performed while the transducer element is under a predetermined torque of the opposite polarity about said axis.~~

~~47. A method of forming a transducer element as claimed in Claim 28 in which the respective magnetisation of the first annulus and the second annulus are performed to provide magnetisation of opposite polarity.~~

~~48. A method as claimed in Claim 46 in which the magnetisation of the first annulus and the second annulus are of the same polarity.~~

~~49. A method as claimed in Claim 47 in which the magnetisation of the first annulus is performed under a predetermined torque of opposite polarity to that applied in the magnetisation of the second annulus.~~

~~50. A method of forming a transducer element which is as claimed in Claim 30 in which the magnetisation of said first annulus and said second annulus is performed while said element is under a predetermined torque about said axis.~~

51. (New) A method of forming a transducer element for the measurement of torque or force comprising:

providing a body of magnetisable material having an axis;

applying a torque to said body about said axis,

maintaining the applied torque while applying a magnetic field to remanently magnetise a region of said body that is annular about said axis whereby the annular region emanates a torque-dependent component of magnetic field which has a significant non-zero value at zero torque.

52. (New) The method of Claim 51 in which the annular region of said body is remanently magnetised to have circumferential magnetisation and said torque-dependent component is in the direction of said axis.

53. (New) The method of Claim 51 in which the annular region of said body is remanently magnetised in the direction of said axis and said torque-dependent component is in the circumferential (tangential) direction with respect to said axis.

54. (New) A method of forming a transducer element for the measurement of torque or force comprising:

providing a body of magnetisable material having an axis;

applying a first torque to said body about said axis,

maintaining the applied first torque while applying a first magnetic field to remanently magnetise a first region of said body that is annular about said axis,

applying a second torque to said body about said axis,

maintaining the second torque while applying a second magnetic field to remanently magnetise a second region of said body that is annular about said axis, and relaxing the second torque.

55. (New) The method of Claim 54 wherein said first region and said second region are spaced axially, each region being remanently magnetised to emanate a respective torque-dependent magnetic field component that has a significant non-zero value at zero torque.

56. (New) The method of Claim 55 wherein each of the first and second regions is remanently magnetised to have a respective circumferential magnetisation and the respective torque-dependent magnetic field component emanated thereby is in the direction of said axis.

57. (New) The method of Claim 55 wherein each of the first and second regions is remanently magnetised in the direction of said axis and the respective torque-dependent magnetic field component emanated thereby is in the circumferential (tangential) direction with respect to said axis.

58. (New) The method of Claim 54 wherein the annular second region is radially outward of the annular first region, and each of the first and second regions is remanently magnetised in the direction of said axis, the first and second regions being magnetised to have opposite polarities of magnetisation.

59. (New) The method of Claim 58 wherein the annular second region is remanently magnetised to emanate a torque-dependent magnetic field component in the circumferential (tangential) direction that has a significant non-zero value at zero torque.

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